UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/630,258	08/01/2000	Marc Hoffman	ADI-005XX	7200

207 7590 11/17/2004		EXAMINER
WEINGARTEN, SCHURGIN, GAGNEBIN & LEBOVICI LLP		DO, CHAT C
TEN POST OFFICE SQUARE		
BOSTON, MA 02109	ART UNIT	PAPER NUMBER
	2124	

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)	
Office Action Summary	09/630,258	HOFFMAN ET AL.	
	Examiner	Art Unit	
	Chat C. Do	2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/18/04; 06/21/04*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This communication is responsive to Amendment, filed 06/21/2004.

2.   Claims 1-8 are pending in the application. Claims 1, 5, and 8 are independent claims. In

Amendment, claims 1, 5, and 8 are amended. This action is made non-final.

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this
> or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed
> in the United States before the invention by the applicant for patent or (2) a patent granted on an application for
> patent by another filed in the United States before the invention by the applicant for patent, except that an
> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this
> subsection of an application filed in the United States only if the international application designated the United
> States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Kiamilev et al.

(U.S. 5,951,627).

Re claim 1, Kiamilev et al. disclose a method of computing a FFT in Figures 8-

12, the method comprising:

(a) receiving N time-ordered first data values (col. 1 lines 64-65 and Figure 2);

(b) sequentially storing in a first memory each of N time-ordered first data values

in the time order (Figure 8 PRAM0);

(c) storing in a second memory a plurality of twiddle factors in a bit reversed

order (col. 2 lines 36-37 and col. 3 lines 57-64);

(d) reading a predetermined number R of input butterfly data values of N first data values wherein predetermined number R of butterfly data values are separated by N/R first data value in N time-ordered first data value (col. 5 lines 53-55 and col. 1 lines 53-62);

(e) performing a radix R butter fly calculation on predetermined number R of butterfly input data using at least one of the plurality of twiddle factors stored in the second memory to generate R output butterfly data values (Figure 8 with PFFT0 and col. 5 lines 32-37);

(f) sequentially storing R output butterfly data values in sequential memory locations of a third memory (col. 5 lines 37-39 and col. 4 lines 16-21); and

(g) performing steps (c) to (f) N/R x 2 times, wherein the predetermined number R is the same predetermined number each time the steps (d)-(f) are performed (col. 1 lines 55-60 with complex numbers data in col. 2 lines 20-26),

wherein reading step (d) includes reading the R butterfly data values from third memory (col. 5 lines 37-40 and col. 5 lines 56-58),

wherein the memory store operation performed in storing step (f) has a unity stride, thereby allowing R butterfly data values to be read from contiguous memory locations each time the R output butterfly data values are read from third memory (col. 5 lines 62-64 and col. 4 lines 16-21), and

wherein steps (a)-(g) are performed in each one of the plurality of computation stages (col. 1 lines 55-63).

Re claim 2, Kiamilev et al. further disclose in Figures 8-12 the steps of replacing

N of first data values in first memory with selected ones of R butterfly output data stored

in third memory location (col. 5 liens 62-64); and repeating steps (c) – (g) a total of $\log_r$

(n) times (col. 1 lines 55-63).

Re claim 3, Kiamilev et al. further disclose in Figures 8-12 R is equal to 2 (col. 1

lines 55-63).

Re claim 4, Kiamilev et al. further disclose in Figures 8-12 R is equal to 4 (col. 1

lines 55-63 wherein radix# is 4).

Re claim 5, Kiamilev et al. disclose in Figures 2 and 8-12 an apparatus for

calculating a fast Fourier transform (abstract lines 1-2), the apparatus comprising:

a plurality of computation stages (e.g. Figure 2 stage 1), each computation stage

comprising:

a first processor stage (e.g. PFFT 0 in Figure 9) having an output including

a first memory storing N time-ordered first data values, N first data values being

stored in first memory sequentially in the time-order (col. 1 lines 64-65 and Figure 2),

a second memory storing a plurality of twiddle factor values, plurality of twiddle

factor values being stored in second memory in a bit-reversed order (col. 2 lines 36-37

and col. 3 lines 57-64),

a third memory storing a plurality of output butterfly data values (PRAM 1 in

Figure 9), and

a fast Fourier transform calculator coupled to first, second, and third memories,

fast Fourier transform calculator being operative (e.g. PFFT 0 in Figure 9)

to receive a predetermined number R of selected input butterfly data values of N

first data values, the predetermined number R of input butterfly data values being

separated by N/R first data values (col. 1 lines 55-63),

to receive at least one twiddle factor value from second memory (col. 2 lines 20-

27 and lines 36-37),

to perform a radix R butterfly calculation to calculate R output butterfly data

values using the at least one twiddle factor value (col. 2 lines 20-28 and col. 5 lines 32-

36),

to write R output butterfly data values into sequential memory locations of third

memory (col. 5 lines 38-40), and

to perform second receiving operation, first performing operation, and writing

operation N/R x 2 times, wherein the predetermined number R is the same predetermined

number each time the second receiving, the first performing, and the writing operations

are performed (col. 1 lines 55-60 with complex numbers data in col. 2 lines 20-26), and

a second processor stage (e.g. PFFT 1 in Figure 9) coupled to output of first

processor stage (e.g. PFFT 0 in Figure 9),

wherein calculations performed in second processing stage include reading-the R

output butterfly data values from third memory (Figures 8-9), and

wherein the memory write operation performed by fast Fourier transform

calculator into the sequential memory locations of third memory has a unity stride,

thereby allowing R output butterfly data values to be read from contiguous memory each

time the R output butterfly data values are read from third memory (col. 4 lines 16-21).

Re claim 6, it is an apparatus claim of claim 3. Thus, claim 6 is also rejected

under the same rationale in the rejection of rejected claim 3.

Re claim 7, it is an apparatus claim of claim 4. Thus, claim 7 is also rejected

under the same rationale in the rejection of rejected claim 4.

Re claim 8, it is a DSP apparatus claim of claim 5. Thus, claim 8 is also rejected

under the same rationale in the rejection of rejected claim 5.

Response to Arguments

3.   Applicant's arguments with respect to claims 1-8 have been considered but are moot in

view of the new ground(s) of rejection.

Conclusion

4.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

a.   U.S. Patent No. 4,899,301 to Nishitani et al. disclose a signal processor for

rapidly calculating a predetermined calculation a plurality of times to typically carrying

out FFT or inverse FFT.

b.   U.S. Patent No. 6,609,140 to Greene discloses methods and apparatus for fast

fourier transforms.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The

examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chaki Kakali can be reached on (571) 272-3719. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

November 3, 2004

KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100